

## Title (en)

A METHOD FOR MANIPULATING AND MIXING MAGNETIC PARTICLES IN A LIQUID MEDIUM

## Title (de)

VERFAHREN ZUR MANIPULATION UND MISCHUNG VON PARTIKELN IN EINEM FLÜSSIGEN MEDIUM

## Title (fr)

PROCÉDÉ DE MANIPULATION ET DE MÉLANGE DE PARTICULES MAGNÉTIQUES DANS UN MILIEU LIQUIDE

## Publication

**EP 2992951 A1 20160309 (EN)**

## Application

**EP 15164921 A 20070621**

## Previously filed application

PCT/IB2007/052410 20070621 WO

## Priority

- IB 2006052005 W 20060621
- IB 2006054182 W 20061109
- EP 07825834 A 20070621

## Abstract (en)

A method of mixing magnetic particles (3) in a microfluidic environment with surrounding medium in a reaction chamber (2) that is a part of a microfluidic network. The method comprises applying magnetic field sequences having polarity and intensity that vary in time. These varying magnetic field sequences are effective to break or inhibit particle claim aggregates and to maintain the particles in suspension as a fog of particles in relative dynamic movement. The magnetic fields from different magnetic poles are combined in a sequence to induce displacement of the fog of particles across the reaction chamber (2), whereby the fog of particles occupies substantially the whole reaction chamber volume quasi-instantaneously or over a period of time.

## IPC 8 full level

**B01F 13/00** (2006.01); **B01F 13/08** (2006.01); **H01F 1/00** (2006.01)

## CPC (source: EP)

**B01F 33/30** (2022.01); **B01F 33/451** (2022.01); **H01F 1/0054** (2013.01); **B82Y 5/00** (2013.01); **B82Y 25/00** (2013.01)

## Citation (applicant)

- US 4230685 A 19801028 - SENYEI ANDREW E, et al
- US 4554088 A 19851119 - WHITEHEAD ROY A [US], et al
- US 4628037 A 19861209 - CHAGNON MARK S [US], et al
- US 6231760 B1 20010515 - SIDDIQI IQBAL W [US]
- US 6764859 B1 20040720 - KREUWEL HERMANUS JOHANNES MARI [NL], et al
- EP 0504192 A1 19920923 - HOLMES MICHAEL JOHN [GB], et al
- US 2006140051 A1 20060629 - KIM JIN-TAE [KR], et al
- US 2005032051 A1 20050210 - HAYES MARK A [US], et al
- US 2004166547 A1 20040826 - SULLIVAN BRIAN M [US], et al
- US 2005208464 A1 20050922 - RIDA AMAR [CH], et al
- WO 2006056579 A2 20060601 - SPINOMIX SA [CH], et al
- SUZUKI, H: "magnetic force driven chaotic micro-mixer", THE PROCEEDINGS OF THE FIFTEENTH IEEE INTERNATIONAL CONFERENCE ON MICRO ELECTRO MECHANICAL SYSTEMS, 2002
- Z. HUGH FAN: "Dynamics DNA hybridization on a Chip Using Paramagnetic Beads", ANALYTICAL CHEMISTRY, vol. 71, 1999
- A. RIDA: "Manipulation of Self-Assembled Structures of Magnetic Beads for Microfluidic Mixing and Assaying", ANALYTICAL CHEMISTRY, vol. 76, 2004

## Citation (search report)

- [XYI] US 2004114458 A1 20040617 - BERTHIER JEAN [FR], et al
- [XII] JP S61153130 A 19860711 - FUJI ELECTRIC CO LTD
- [XII] EP 0240862 A1 19871014 - LEO AB [SE]
- [XII] JP 2005007226 A 20050113 - YASKAWA ELECTRIC CORP
- [XD] EP 1658890 A2 20060524 - SAMSUNG ELECTRONICS CO LTD [KR]
- [YDA] EP 1662256 A1 20060531 - SPINOMIX SA [CH]
- [XD] RIDA A ET AL: "MANIPULATION OF SELF-ASSEMBLED STRUCTURES OF MAGNETIC BEADS FOR MICROFLUIDIC MIXING AND ASSAYING", ANALYTICAL CHEMISTRY, AMERICAN CHEMICAL SOCIETY, US, vol. 76, no. 21, 1 November 2004 (2004-11-01), pages 6239 - 6246, XP001226101, ISSN: 0003-2700, DOI: 10.1021/AC049415J

## Designated contracting state (EPC)

AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC MT NL PL PT RO SE SI SK TR

## DOCDB simple family (publication)

**WO 2008007270 A2 20080117; WO 2008007270 A3 20080417;** AU 2007274748 A1 20080124; CA 2654808 A1 20080124; CA 2654808 C 20150714; CA 2654841 A1 20080117; CA 2654841 C 20150616; CN 101522294 A 20090902; CN 101522294 B 20120516; CN 102764607 A 20121107; CN 102764607 B 20150107; EP 2038051 A2 20090325; EP 2038051 A4 20121212; EP 2038051 B1 20150610; EP 2038900 A2 20090325; EP 2038900 A4 20121212; EP 2038900 B1 20160420; EP 2992951 A1 20160309; EP 3089173 A1 20161102; ES 2546941 T3 20150930; JP 2009541734 A 20091126; JP 2014002160 A 20140109; JP 2016014678 A 20160128; JP 5385131 B2 20140108; JP 5801356 B2 20151028; JP 6030197 B2 20161124; WO 2008010111 A2 20080124; WO 2008010111 A3 20081030

## DOCDB simple family (application)

**IB 2007052409 W 20070621;** AU 2007274748 A 20070621; CA 2654808 A 20070621; CA 2654841 A 20070621; CN 200780029232 A 20070621; CN 201210059483 A 20070621; EP 07825833 A 20070621; EP 07825834 A 20070621; EP 15164921 A 20070621; EP 16158317 A 20070621; ES 07825834 T 20070621; IB 2007052410 W 20070621; JP 2009516052 A 20070621; JP 2013162699 A 20130805; JP 2015166326 A 20150826